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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,810	06/19/2001	Brian Rodricks	DRC-741US	3495

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EXAMINER	
GAGLIARDI, ALBERT J	
ART UNIT	**PAPER NUMBER**
2878	

DATE MAILED: 01/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/884,810	RODRICKS ET AL.
	Examiner	Art Unit
	Albert J. Gagliardi	2878

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,9-13 and 15-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,9-13 and 15-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 June 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.84(h)(5) because Figure 1 show(s) modified forms of construction in the same view (element 60 is disclosed as an equivalent electrical circuit of the pixel elements and should be designated as a separate figure). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance. The examiner also notes that the specification should also be amended as necessary to reflect any drawing changes.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-3, 6, 9-10, 12, 15-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable Ikeda *et al.* (US 6,323,490 B1) in view of Yamada *et al.* (US 6,163,029).

Regarding clalm 1, *Ikeda* discloses (Figs. 3-4) a prior art digital x-ray imaging device comprising a top (upper) electrode layer; a dielectric layer; a sensor layer under the dielectric layer and comprising a photoconductive layer and a plurality of pixels, each pixel comprising a charge collection electrode; a thin film transistor readout matrix connected to the charge collection electrode; and a variable power supply adapted to provide a range of voltages between the top electrode layer and the readout matrix (see generally Fig. 3).

Regarding the range of voltages establishing electric fields that effect the signal-to-noise and the saturation of the device, the examiner notes that such functional language regarding the range of voltages does not, in and of itself, suggest or imply any structural limitations which distinguish the claimed apparatus from the apparatus disclosed by *Ikeda*.

Note: Apparatus claims must be structurally distinguishable from the prior art. Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). Apparatus claims cover what a device is, not what a device does. *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990). See MPEP 2114.

Regarding the variable power supply being set to a selected voltage within the range matching the selected object being imaged with the digital imaging device, the examiner notes that while *Ikeda* does not specifically identify the criteria used to determine the selected voltage, *Yamada* discloses a digital x-ray imaging device utilizing an adjustable bias voltage wherein the voltage is selected to match the selected object being imaged with the imaging device (col. 9,

lines 9-18). *Yamada* teaches that optimization of the variable bias voltages according to the particular irradiation conditions allows for increased dynamic range of the device and improved sensitivity (col. 14, line 64 to col. 15, line 3). As such, it would have been obvious to a person of ordinary skill in the art to modify the device suggested by *Ikeda* (if not already an inherent aspect of the device) such that the bias voltage is selected based on the object being imaged in order to allow for improved dynamic range and increased sensitivity.

Regarding claim 2, *Ikeda* discloses that the variable power supply comprises a programmable power supply (see generally Fig. 3).

Regarding claim 3, *Ikeda* discloses that the photoconductive layer may comprise selenium (see generally Fig. 3).

Regarding claim 6, in the device suggested *Ikeda* and *Yamada* as applied above, *Yamada* discloses (Fig. 13) that the power supply (97) is adapted to provide a range of voltages with a turndown ratio (col. 14, line 39 to col. 15, line 20). Although *Yamada* does not specify the numeric value of the turndown ratio, *Yamada* does disclose that the applied bias voltages of prior art imaging devices can include bias voltages that span at least 1700 V to 1000 V (see generally Fig. 3B), which suggests a variable power supply providing a turndown ratio of at least about 2:1 (a ratio of 1.7:1 is viewed as sufficiently close enough to a ratio of 2:1 so as to be "approximately" a 2:1 ratio or an obvious variation thereof.

The examiner additionally notes that the range of voltages disclosed according to Fig. 3 merely suggests a minimum range of voltages, and that it would have been obvious to a person of ordinary skill in the art to allow for a broader range of voltages so as to maximize the

versatility of the device for use under a wide range of irradiation conditions (the purported purpose of variable bias voltage -- col. 14, line 1-9).

Regarding claim 9, *Ikeda* as modified in view of *Yamada* as applied above, suggests a method of providing a broad dynamic range for a digital imaging device and controlling a signal-to-noise behavior (i.e., intensifying density resolution and reading a minute change of contrast as noted at col. 15, lines 1-3 of *Yamada*) and prevent saturation (see generally Figs. 14A, B of *Yamada*) comprising a top (upper) electrode layer; a dielectric layer; a sensor comprising a photoconductive layer and a plurality of pixels, each pixel comprising a charge collection electrode; a thin film transistor readout matrix connected to the charge collection electrode; and a power supply for providing a voltages between the top electrode layer and the readout matrix, the method comprising varying the voltage between the top electrode layer and the readout matrix to provide an acceptable signal-to-noise ratio over a greater range of exposures than provided by a single voltage (*Yamada*, col. 14, lines 1-9; and col. 14, line 64 to col. 15, line 3), wherein the step of varying the voltage comprises varying the voltage to establish electrical fields ranging from a minimum electrical field E_c, at which the device has a relatively high signal-to-noise ratio but still below a saturation point, to a higher electrical field E, at which the device has a signal-to-noise ratio that is still above an acceptable value (see generally Figs. 14A, B); and said varying further comprising ultimately setting the voltage at a level within the range matching an object being examined with said device.

Regarding the electrical field E allowing for a signal-to-noise of at least 50, the examiner notes that *Yamada* discloses that bias voltage is varied to allow for optimization of the device to allow for detecting a minute change of contrast (col. 15, lines 1-3) which would suggest to a

person of ordinary skill in the art that the voltage is varied to allow for the detection of contrast changes of less than about 2% which corresponds to a signal-to-noise-ratio of at least 50:1 (the measurement of a change of contrast of less than about 2% is regarded as a typical for digital imaging devices -- see also applicant's specification at page 7, lines 10-17-- and is regarded as an inherent aspect of the claimed device. The examiner also notes that the actual numeric value of the signal-to-noise ratio at any particular voltage is dependent on the actual imaging device to which the voltage is applied, and is an inherent property thereof. Since the structure recited in the reference is substantially identical to that of the claims, a specific signal-to-noise ratio of 50:1 is presumed to be inherent (See MPEP 2112.01).

Regarding claim 10, *Ikeda* suggests using the method for the non-destructive testing of one or more objects (i.e., a patient) (see generally Fig. 6, ref. no. 9252).

Regarding claim 12, *Yamada* suggests that the range of voltages should be at least between at least 1.0 kV and about 1.7 kV, which overlaps the recited range of between about 1.5, kV and about 3.0 kV.

Regarding claim 15, the method of operating a digital imaging device as claimed is suggested by the method of providing a broad dynamic range for a digital imaging device as applied to claims 9 and 10 above, and is rejected accordingly.

Regarding claim 16, *Yamada* (see explanation regarding claim 6 above), suggests that the range of voltages should be at least between at least 1.0 kV and about 1.7 kV, which overlaps the recited range of between about 1.5, kV and about 3.0 kV.

Regarding claims 17-18, the specific signal-to-noise ratio achieved is presumed to be an inherent property of the imaging device (see explanation regarding claim 9 above).

Regarding claim 20, *Yamada* suggests presetting a number of selected voltages for use with respective types of specimens (col. 14, lines 9-13).

5. Claims 4-5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Ikeda* and *Yamada* as applied above, and further in view of Yamane *et al.* (US 6,330,303 B1).

Regarding claim 4, although *Ikeda* does not specifically identify the thickness of the photoconductive layer, those skilled in the art appreciate that a particular thickness of the photoconductive layer as being between 100 μm and 1000 μm is typical in the art and would have been a matter of routine design choice depending on a variety of factors including such factors as the particular photoconductive material used and the energy of the incident radiation. *Yamane*, for example, discloses a digital x-ray imaging device wherein the selenium photoconductive layer is about 100 μm to 1000 μm (300 μm to 600 μm) thick (col. 3, lines 8-11).

Regarding claim 5, *Yamane* suggests that the photoconductive layer may be about 500 μm thick (i.e., within the range of 300 μm to 600 μm) (col. 3, lines 8-11).

Regarding claim 7, in the device suggested by *Ikeda*, *Yamada*, and *Yamane*, as applied above, *Yamada* (see explanation regarding claim 6 above), suggests that the range of voltages should be between at least 1.0 kV and about 1.7 kV which overlaps the recited range of between about 1.5 kV and about 3.0 kV.

6. Claims 11, 13, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Ikeda* and *Yamada* as applied above, and further in view of Kramer e*t al.* (US 5,379,336).

Regarding claim 11, *Ikeda* and *Yamada* do not specifically identify the objects tested as being one of a PC board, a wax or metal casting, a turbine blade or a racket cone.

Regarding the object being a manufactured object such as a turbine blade, *Kramer* discloses that besides being useful in biomedical imaging applications, solid state digital x-ray imaging devices can be used for non-destructive testing of manufactured objects (abstract), wherein such manufactured objects can include at least printed circuit boards, castings, and turbine blades (col. 2, lines 19-28).

Therefore it would have been obvious to one skilled in the art to modify the method suggested by *Ikeda* and *Yamada* such that the imaging device is used to perform testing on objects such as printed circuit boards, castings, and turbine blades, as suggested by *Kramer*, in view of the known suitability of x-ray imaging devices for such purposes.

Regarding claim 13, *Kramer* suggests using digital x-ray imaging devices for non-destructive testing wherein the range of x-ray energies is from about 1 KeV to greater than 100 KeV (col. 4, lines 17-23) and also greater than 1 MeV (col. 6, line 19 -- the radiation energy of Cobalt 60 is known to be approximately 1.2 MeV) which overlaps the recited range of between about 10 keV to about 10 MeV.

Regarding claim 19, the specific signal-to-noise ratio achieved over any particular range of exposures is presumed to be an inherent property of the imaging device (see explanation regarding claim 9 above).

Response to Arguments

7. Applicant's arguments with respect to claims 1-7, 9-13 and new claims 15-20 have been considered but are moot in view of the new ground(s) of rejection.

In particular regards to applicant's argument regarding maintaining a signal-to-noise ratio of at least 50, while staying clear saturation, by varying the electric field, the examiner notes, as

pointed out in the above rejections, that *Yamada* clearly suggests varying the electric field to effectively utilize the dynamic range of the device thereby intensifying density resolution (i.e., maximizing the signal-to-noise ratio) (col. 15, lines 1-3) while staying clear of saturation (see generally Figs. 14 A, B). As noted above specific noise ratios are inherent properties of the imaging device and, therefore, presumed to be inherent properties.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Albert J. Gagliardi whose telephone number is (703) 305-0417. The examiner can normally be reached on Monday thru Friday from 9 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (703) 308-4852. The fax phone numbers for the

organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

AJG
January 15, 2003

DAVID PORTA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800